REMARKS

In section 1 of the Office Action, the Examiner objected to claims 31-35 as being dependent from a canceled claim. These claims are amended to overcome this objection.

In section 2 of the Office Action, the Examiner rejected claims 11-17 under 35 U.S.C §112 first paragraph as containing subject matter not described in the specification of the present application. Accordingly, claim 17 has been amended to overcome this rejection.

In section 4 of the Office Action, the Examiner rejected claims 31-35 under 35 U.S.C §112 second for the reasons given in section 1 of the Office Action. The amended claims overcome this rejection.

In section 6 of the Office Action, the Examiner rejected independent claim 37 and dependent claims 3-6 under 35 U.S.C §102(e) as being anticipated by the Bohlinger patent.

The Bohlinger patent discloses a magnetic field sensor 10 in the form of an integrated circuit. An integrated circuit die 12 has formed thereon a coil 14 that extends from a set or set reset pad 16 in a clockwise spiral and terminates at a pad 18. Magnetoresistive elements 20, 28, 30, and 32 are

connected in a first Wheatstone bridge arrangement with power supply connections at Vcc1(X) and Vcc2(X) and an output voltage connection between Vout+(X) and Vout-(X). The direction of sensitivity of the first Wheatstone bridge is shown by arrow 33 and this bridge acts as the x-axis sensor.

Magnetoresistive elements 34, 36, 38 and 40 are shown connected as a second Wheatstone Bridge arrangement with power supply connections at Vcc1(Y) and Vcc2(Y) and an output voltage connection between Vout+(Y) and Vout-(Y). The direction of sensitivity of the second Wheatstone bridge is shown by arrow 41 and this bridge acts as the Y axis sensor.

The current through the coil 14 may be used to simply set the magnetization of the magnetoresistive elements prior to a reading. The current may also be applied in one direction prior to taking a first reading and in the opposite direction before taking a second reading in a set/reset application. A current passing through the coil 14 generates a magnetic field that is perpendicular to the coil 14.

Independent claim 37 is directed to an integrated signal isolator having first and second ends. The integrated signal isolator comprises first and second

isolator input terminals to receive a signal to be isolated, first and second isolator output terminals to provide an isolated output signal, first and second power supply terminals, first, second, third, and fourth magnetoresistors, and an input strap. The first and second magnetoresistors are coupled in series from the first power supply terminal to the second power supply terminal, and the third and fourth magnetoresistors are coupled in series from the second power supply terminal to the first power supply terminal. The first isolator output terminal is coupled to a junction between the first and second magnetoresistors, and the second isolator output terminal is coupled to a junction between the third and fourth magnetoresistors. The first and second power supply terminals cause a current to flow in a direction though the first, second, third, and fourth magnetoresistors. The input strap has at least one turn coupled between the first and second isolator input terminals. The input strap is disposed with respect to the first, second, third, and fourth magnetoresistors so that a magnetic field is generated over the first and second magnetoresistors in one direction, and so that a magnetic field is generated over the third and fourth magnetoresistors in an opposite direction. The current

through the input strap flows in a direction parallel to the direction of current flow through the first, second, third, and fourth magnetoresistors.

As can be seen Figure 1 of the Bohlinger patent, the current through the coil 14 flows in a direction that is perpendicular, not parallel, to the direction of current flow through the magnetoresistive elements 20, 28, 30, and 32.

Thus, independent claim 37 is not anticipated by the Bohlinger patent.

Because independent claim 37 is not anticipated by the Bohlinger patent, dependent claims 3-6 are likewise not anticipated by the Bohlinger patent.

In addition, dependent claims 4 and 5 recite that each of the magnetoresistors comprises a serpentine structure having a plurality of elongated magnetoresistive portions coupled end-to-end, and that the elongated portions of the magnetoresistors are positioned near and in parallel to elongated portions of the input strap.

As shown in Figure 1 of the Bohlinger patent, the elongated portions of the magnetoresistors are perpendicular, not parallel, to the elongated portions of the coil 14.

For this additional reason, dependent claims 4 and 5 are not anticipated by the Bohlinger patent.

In section 7 of the Office Action, the Examiner rejected independent claim 11 under 35 U.S.C §102(b) as being anticipated by the Dettmann patent.

The Dettmann patent discloses a meandering conductor 6 located on a film substrate and into which a current I_M is fed. Magnetoresistive film strips 1 are disposed above the conductor 6 such that the longitudinal axes of the magnetoresistive film strips 1 are perpendicular to the meandering strips of the conductor 6. Barber pole structures form alternating negative and positive angles 3 and 4 with the longitudinal direction of the magnetoresistive film strips 1. The magnetoresistive film strips 1 are electrically connected in series so as to form a single magnetoresistor. A constant current is supplied though the magnetoresistive film strips 1. Following a current pulse through the conductor 6, re-magnetization directions are set in the magnetoresistive film strips 1 as shown by the corresponding arrows. In these re-magnetization directions, an external magnetic field H_e to be measured causes an increase in the resistance value in all of the magnetoresistive film strips 1 compared to the field-free

state. A current pulse in the opposite direction through the conductor 6 rotates the magnetizations of all of the magnetoresistive film strips 1 in the opposite direction.

Independent claim 11 is directed to an integrated signal isolator having first and second ends. The integrated signal isolator comprises first, second, third, and fourth magnetoresistors and an input strap. The first, second, third, and fourth magnetoresistors are located between the first and second ends, the first and second magnetoresistors are coupled in series from a first power supply terminal to a second power supply terminal, the third and fourth magnetoresistors are coupled in series from the second power supply terminal to the first power supply terminal, a junction between the third and fourth magnetoresistors is coupled to a first isolator output terminal, a junction between the first and second magnetoresistors is coupled to a second isolator output terminal, and the first and second power supply terminals cause a current to flow in a direction though the first, second, third, and fourth magnetoresistors. The input strap has at least one turn coupled between first and second isolator input terminals, the at least one turn has a first portion extending from the first end to the second end and

running lengthwise alongside only the first and second magnetoresistors and a second portion extending from the second end to the first end and running lengthwise alongside only the third and fourth magnetoresistors, the at least one turn is arranged so that current supplied to the input strap flows through the first portion in a first direction from the first end to the second end and through the second portion in a second direction from the second end to the first end, the first and second directions are substantially opposite to one another, and the first and second directions of current flowing through the input strap are parallel to the direction of current flow through the first, second, third, and fourth magnetoresistors.

The Dettmann patent discloses no junction between the third and fourth magnetoresistors coupled to a first isolator output terminal, and no junction between the first and second magnetoresistors coupled to a second isolator output terminal. Indeed, the Dettmann patent specifically discloses that all of the magnetoresistive film strips 1 are electrically connected in series to form a single magnetoresistor.

For this reason, independent claim 11 is not anticipated by the Dettmann patent.

Also, the Dettmann patent does not disclose an input strap having a first portion running lengthwise alongside only the first and second magnetoresistors and a second portion running lengthwise alongside only the third and fourth magnetoresistors. Instead, the conductor 6 runs across the magnetoresistive film strips 1.

For this additional reason, independent claim 11 is not anticipated by the Dettmann patent.

Moreover, the Dettmann patent does not disclose a current flowing through the conductor 6 that is parallel to the direction of current flow through the magnetoresistors. Instead, the Dettmann patent discloses that the current flowing through the conductor 6 is perpendicular to the direction of current flow through the magnetoresistors.

For this yet additional reason, independent claim 11 is not anticipated by the Dettmann patent.

In section 8 of the Office Action, the Examiner rejected claims 3-17 and 31-37 under 35 U.S.C. §102(b) as being anticipated by the Wan patent.

The Wan patent discloses a first magnetoresistor 24, a second magnetoresistor 26, a third magnetoresistor 30, and a fourth magnetoresistor 28

forming a Wheatstone bridge. The first and second magnetoresistors 24 and 26 are coupled in series from a first power supply terminal 44 to a second power supply terminal 40/48, and the third and fourth magnetoresistors 30 and 28 are coupled in series from the second power supply terminal 40/48 to the first power supply terminal 44. A current strap 70 produces a magnetic field over the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 in the same direction.

A set-reset strap 54 is in the form of a spiral that extends in a clockwise direction and that includes segments 60 which pass above the fourth and third magnetoresistors 28 and 30, and segments 62 which pass above the first and second magnetoresistors 24 and 26. With a current entering pad 56 and leaving at pad 58, the current in segments 60 will cause a magnetization in the fourth and third magnetoresistors 28 and 30 in a first direction towards a central part of die 20 and the current in segments 62 will cause a magnetization in the first and second magnetoresistors 24 and 26 in a second direction towards a central part of die 20, where the first and second directions are opposite to one another.

Independent claim 37 - The set-reset strap 54 is not disposed so that current flowing through it is

parallel to the current flowing through the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28. Instead, the set-reset strap 54 is disposed so that current flowing through it is perpendicular to the current flowing through the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28.

Moreover, the current strap 70 disclosed in the Wan patent is not disposed as required by independent claim 37. That is, the input strap 70 is not disposed with respect to the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 so that a magnetic field is generated over the first and second magnetoresistors 24 and 26 in one direction, and so that a magnetic field is generated over the third and fourth magnetoresistors 30 and 28 in an opposite direction.

Instead, current flowing through the input strap 70, depending on polarity, enters the input strap 70 at the pad 66 and exits the input strap 70 at the pad 68. Accordingly, the current flows along the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 in the same direction producing a magnetic field over all of the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 in the same direction.

Accordingly, the Wan patent does not disclose a coil that meets the limitations of independent claim 37.

Therefore, the Wan patent does not anticipate independent claim 37.

Because the Wan patent does not anticipate independent claim 37, and the Wan patent does not anticipate dependent claims 3-10 and 31-35.

In addition, dependent claims 4 and 5 recite that each of the magnetoresistors comprises a serpentine structure having a plurality of elongated magnetoresistive portions coupled end-to-end, and that the elongated portions of the magnetoresistors are positioned near and in parallel to elongated portions of the input strap.

As shown in Figure 1 of the Wan patent, the elongated portions of the magnetoresistors are perpendicular, not parallel, to the elongated portions of the set-reset strap 54.

For this additional reason, dependent claims 4 and 5 are not anticipated by the Wan patent.

Dependent claim 9 recites a set-reset coil that momentarily sets and resets a direction of magnetization of the first, second, third, and fourth magnetoresistors,

and that runs across the first, second, third, and fourth magnetoresistors.

If, as interpreted by the Examiner, the set-reset strap 54 of the Wan patent is the input strap of independent claim 37 and the current strap 70 of the Wan patent is the set-reset strap of dependent claim 9, then the current strap 70 of the Wan patent does not run across any of the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 as required by dependent claim 9.

For this additional reason, dependent claim 9 is not anticipated by the Wan patent.

Independent claim 11 - The set-reset strap 54 is not disposed so that current flowing through it is parallel to the current flowing through the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28.

Moreover, the input strap 70 is not disposed as required by independent claim 11. That is, the input strap 70 is not disposed with respect to the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 so that a magnetic field is generated over the first and second magnetoresistors 24 and 26 in one direction, and so that a magnetic field is generated over

the third and fourth magnetoresistors 30 and 28 in an opposite direction.

Instead, current flowing through the input strap 70, depending on polarity, enters the input strap 70 at the pad 66 and exits the input strap 70 at the pad 68. Accordingly, the current flows along the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 in the same direction producing a magnetic field over all of the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 in the same direction.

Accordingly, the Wan patent does not disclose a coil that meets the limitations of independent claim 11.

Therefore, the Wan patent does not anticipate independent claim 11 and dependent claims 12-17.

Dependent claim 16 further recites a set-reset coil having a plurality of clockwise turns and a plurality of counterclockwise turns. The set-reset coil momentarily sets and resets a direction of magnetization of first, second, third, and fourth magnetoresistors. Each clockwise turn of the set-reset coil has a portion running across the first and fourth magnetoresistors, each counterclockwise turn of the set-reset coil has a portion running across the second and third

magnetoresistors, and the clockwise and counterclockwise turns are arranged so that current supplied to the set-reset coil flows through the portions of each of the clockwise and counterclockwise turns in the same direction.

If, as interpreted by the Examiner, the set-reset strap 54 of the Wan patent is the input strap of independent claim 37 and the current strap 70 of the Wan patent is the set-reset strap of dependent claim 16, then the current strap 70 of the Wan patent does not run across any of the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 as required by dependent claim 16.

For this additional reason, dependent claim 16 is not anticipated by the Wan patent.

Dependent claim 17 further recites a set-reset coil having a plurality of turns disposed with respect to the first, second, third, and fourth magnetoresistors so that the set-reset coil generates a momentary magnetic field across the first, second, third, and fourth magnetoresistors in the same direction.

If, as interpreted by the Examiner, the set-reset strap 54 of the Wan patent is the input strap of independent claim 37 and the current strap 70 of the Wan

patent is the set-reset strap of dependent claim 17, then the current strap 70 of the Wan patent does not generate a momentary magnetic field across the first, second, third, and fourth magnetoresistors as required by dependent claim 17.

For this additional reason, dependent claim 17 is not anticipated by the Wan patent.

Independent claim 36 - The set-reset strap 54 is not disposed so that current flowing through it is parallel to the current flowing through the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28.

Moreover, the input strap 70 is not disposed as required by independent claim 36. That is, the input strap 70 is not disposed with respect to the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 so that a magnetic field is generated over the first and second magnetoresistors 24 and 26 in one direction, and so that a magnetic field is generated over the third and fourth magnetoresistors 30 and 28 in an opposite direction.

Instead, current flowing through the input strap 70, depending on polarity, enters the input strap 70 at the pad 66 and exits the input strap 70 at the pad

68. Accordingly, the current flows along the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 in the same direction producing a magnetic field over all of the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 in the same direction.

Accordingly, the Wan patent does not disclose a coil that meets the limitations of independent claim 36.

Therefore, the Wan patent does not anticipate independent claim 36.

In section 10 of the Office Action, the Examiner rejected claims 3-8, 11-15, and 31-37 under 35 U.S.C. §103 as being unpatentable over the Daughton patent in view of the Bohlinger patent.

The Daughton patent discloses a signal isolator formed as a portion of a semiconductor chip 10. An insulating layer 11 is provided over a first metalization interconnection network 12 to form a part of an upper surface 13 of the semiconductor chip 10 after a second and final chip metallization that forms a metalization interconnection network 14. The metalization interconnection networks 12 and 14 are provided on the semiconductor chip 10 for interconnecting various integrated circuit components.

The semiconductor chip 10 includes a NiFeCo alloy layer 16 and a CoFe alloy layer 17. The NiFeCo alloy layer 16 is provided on a base metal layer 15. The CoFe alloy layer 17 is provided on the NiFeCo alloy layer 16 and has a magnetic saturation induction that is higher than that of the NiFeCo alloy layer 16. An intermediate nonmagnetic electrical conductor layer 18 is provided on the CoFe alloy layer 17. A hard ferromagnetic thin-film CoFe layer 19 is formed on the intermediate nonmagnetic electrical conductor layer 18. An antiferromagnetic IrMn layer 20 is formed on the hard ferromagnetic thin-film CoFe layer 19. A tantalum passivation layer 21 is formed over the antiferromagnetic IrMn layer 20. An etch stop layer 22 is deposited on the tantalum passivation layer 21. A photoresist is deposited and patterned with a photomask, and etch and milling steps are performed to form four separated magnetoresistors 23A, 23B, 23C, and 23D which serve as members of a current sensor bridge circuit. The magnetoresistors 23A, 23B, 23C, and 23D are connected to leads 24A, 24B, 24C, 24D, 24E, 24F, 24G, and 24H.

The leads 24A and 24D connect the magnetoresistors 23B and 23D together, and the leads 24B and 24C connect the magnetoresistors 23A and 23C

together. The lead 24E connects the magnetoresistors 23A and 23B to a positive voltage supply. The lead 24F connects the magnetoresistors 23C and 23D to a ground reference. The lead 24G is connected to the junction between the magnetoresistors 23A and 23C to form a first bridge output which is coupled to an input of an amplifier. Similarly, the lead 24H is connected to the junction between the magnetoresistors 23B and 23D to form a second bridge output which is coupled to another input of the amplifier.

Accordingly, in terms of independent claims 11, 36, and 37, if the magnetoresistor 23B is chosen as the first magnetoresistor, then the magnetoresistor 23D is the second magnetoresistor, the magnetoresistor 23C is the third magnetoresistor, and the magnetoresistor 23A is the fourth magnetoresistor. (It is noted that the magnetoresistor 23B is arbitrarily chosen as the first magnetoresistor of the claims. However, the analyses contained in this response are the same regardless of which of the magnetoresistors 23A, 23B, 23C, and 23D is chosen as the first magnetoresistor).

A silicon nitride insulating layer 25 is deposited over the magnetoresistors 23A, 23B, 23C, and 23D and the associated leads 24A-24H. Openings are

formed through the silicon nitride insulating layer 25 to provide appropriate connections to the bridge. An electric field interrupter layer 26B is provided over the silicon nitride insulating layer 25 and is connected to the ground reference.

A dielectric layer 27 is provided between an input coil 29 and the electric field interrupter 26B, and also between the magnetoresistors 23A, 23B 23C, and 23D and the electric field interrupter 26B. A mechanically stiffening layer 28 is provided on the dielectric layer 27 to provide a firmer base for supporting the input coil 29. The input coil 29 and corresponding pads 30 are then formed.

A further dielectric layer is then coated on the input coil 29, the pads 30, the exposed sides of he stiffening layer 28, the exposed surfaces of the dielectric layer 27, and the exposed surfaces of the interconnection network 14 leaving expose portions of the relevant bonding pads.

As shown in Figure 1A, the turns of the input coil 29 extend over the magnetoresistors 23A, 23B 23C, and 23D, crossing them perpendicularly. Accordingly, the long sides of the magnetoresistors 23A, 23B, 23C, and 23D are perpendicular to the direction of the portions of the

coil 29 that pass near the magnetoresistors 23A, 23B, 23C, and 23D. Thus, a current in the coil 29 generates magnetic fields which are perpendicular to the coil 29 and parallel to the elongated portion sides of the magnetoresistors 23A, 23B, 23C, and 23D.

Current in the coil 29 flows in opposite directions over the first and second magnetoresistors 23B and 23D. Therefore, the first and second magnetoresistors 23B and 23D experience magnetic fields in opposite directions. Similarly, current in the coil 29 flows in opposite directions over the third and fourth magnetoresistors 23C and 23A. Therefore, the third and fourth magnetoresistors 23C and 23A experience magnetic fields in opposite directions.

Independent claim 37 - Independent claim 37 recites that the current through the input strap flows in a direction parallel to the direction of current flow through the first, second, third, and fourth magnetoresistors.

As shown in the Daughton patent, the current through the input coil 29 flows in a direction that is perpendicular, not parallel, to the direction of current flow through the first, second, third, and fourth magnetoresistors 23B, 23D, 23C, and 23A.

Similarly, the Bohlinger patent shows an arrangement in which the current through the coil 14 flows in a direction that is perpendicular, not parallel, to the direction of current flow through the first, second, third, and fourth magnetoresistors 30, 32, 20, and 28.

Therefore, the combination of the Daughton patent and the Bohlinger patent would not have lead one of ordinary skill in the art to the invention of independent claim 37.

Accordingly, independent claim 37 is not unpatentable over the Daughton patent in view of the Bohlinger patent.

Moreover, the Daughton patent explicit discloses at column 19, line 62 through column 20, line 17 that the first and second magnetoresistors 23B and 23D are connected in series from the positive supply to ground, and that the third and fourth magnetoresistors 23C and 23A are connected in series from ground to the positive supply. This portion of the Daughton patent also states that the junction between the first and second magnetoresistors 23B and 23D forms one output of the bridge, and that the junction between third and

fourth magnetoresistors 23C and 23A forms the other output of the bridge.

This portion of the Daughton patent further states the magnetic fields in the first and second magnetoresistors 23B and 23D are opposite to one another, whereas independent claim 37 requires these magnetic fields to be in the same direction. Similarly, this portion of the Daughton patent further states the magnetic fields in the third and fourth magnetoresistors 23C and 23A are opposite to one another, whereas independent claim 37 requires these magnetic fields to be in the same direction.

The Examiner has not addressed this issue and has not explained why it would have been obvious in view of the Bohlinger patent to the align the fields produced by current through the coil 29 with the magnetoresistors 23A, 23B, 23C, and 23D as required by independent claim 37. Therefore, the Examiner has not established a *prima facie* case of obviousness with respect to independent claim 37.

Accordingly, for this reason also, independent claim 37 is not unpatentable over the Daughton patent in view of the Bohlinger patent.

Moreover, the Daughton patent discloses a very unusual arrangement of connecting the magnetoresistors 23A, 23B, 23C, and 23D in a bridge configuration. Thus, instead of coupling the geographically proximate magnetoresistors 23A and 23D in series between two power supply terminals and instead of coupling the geographically proximate magnetoresistors 23B and 23C in series between the two power supply terminals as require by independent claim 37, the Daughton patent discloses coupling the geographically distal magnetoresistors 23A and 23C in series between two power supply terminals and coupling the geographically distal magnetoresistors 23B and 23D in series between two power supply terminals. This difference alone would have suggested to one of ordinary skill in the art that the disclosures of the Daughton patent and the Bohlinger patent are opposite to one another and should not be combined.

Furthermore, since the Bohlinger patent shows an arrangement in which the first and second magnetoresistors 30 and 32 are coupled in series between two power supply terminals and in which the third and fourth magnetoresistors 20 and 28 are coupled in series between two power supply terminals, no useful purpose

would be served by combining the Daughton patent and the Bohlinger patent.

Accordingly, combining the Daughton patent and the Bohlinger patent so as meet independent claim 37 would not have been obvious to one of ordinary skill in the art.

Therefore, for these additional reasons, independent claim 37 is not unpatentable over the Daughton patent in view of the Bohlinger patent.

Because independent claim 37 is not unpatentable over the Daughton patent in view of the Bohlinger patent, dependent claims 3-8 and 31-35 are not unpatentable over the Daughton patent in view of the Bohlinger patent.

Independent claim 11 - Independent claim 11 recites that the direction of current flow through the input strap is parallel to the direction of current flow through the first, second, third, and fourth magnetoresistors.

As shown in the Daughton patent, the current through the coil 29 flows in a direction that is perpendicular, not parallel, to the direction of current flow through the first, second, third, and fourth magnetoresistors 23B, 23D, 23C, and 23A.

Similarly, the Bohlinger patent shows an arrangement in which the current through the coil 14 flows in a direction that is perpendicular, not parallel, to the direction of current flow through the first, second, third, and fourth magnetoresistors 30, 32, 20, and 28.

Therefore, the combination of the Daughton patent and the Bohlinger patent would not have lead one of ordinary skill in the art to the invention of independent claim 11.

Accordingly, independent claim 11 is not unpatentable over the Daughton patent in view of the Bohlinger patent.

Moreover, the Daughton patent explicitly discloses at column 19, line 62 through column 20, line 17 that the first and second magnetoresistors 23B and 23D are connected in series from the positive supply to ground, and that the third and fourth magnetoresistors 23C and 23A are connected in series from ground to the positive supply. This portion of the Daughton patent also states that the junction between the first and second magnetoresistors 23B and 23D forms one output of the bridge, and that the junction between the third and

fourth magnetoresistors 23C and 23A forms the other output of the bridge.

Therefore, the magnetoresistors 23B and 23D are the first and second the magnetoresistors of independent claim 11, and the magnetoresistors 23C and 23A are the third and fourth the magnetoresistors of independent claim 11. (Alternatively, the magnetoresistors 23A and 23C are the first and second the magnetoresistors of independent claim 11, and the magnetoresistors 23D and 23B are the third and fourth the magnetoresistors of independent claim 11.)

Consequently, the coil 29 does not have a first portion that runs lengthwise alongside only the first and second magnetoresistors and a second portion that runs lengthwise alongside only the third and fourth magnetoresistors as recited in independent claim 11.

The Examiner has not addressed this issue and has not explained why it would have been obvious in view of the Bohlinger patent to the align the coil 29 with the magnetoresistors 23A, 23B, 23C, and 23D as required by independent claim 11. Therefore, the Examiner has not established a *prima facie* case of obviousness with respect to independent claim 11.

Accordingly, for this reason also, independent claim 11 is not unpatentable over the Daughton patent in view of the Bohlinger patent.

Moreover, the Daughton patent discloses a very unusual arrangement of connecting the magnetoresistors 23A, 23B, 23C, and 23D in a bridge configuration and of aligning the coil 29 with those magnetoresistors. Thus, instead of coupling the geographically proximate magnetoresistors 23A and 23D in series between two power supply terminals and aligning a first portion of the coil 29 with only these two magnetoresistors, and instead of coupling the geographically proximate magnetoresistors 23B and 23C in series between the two power supply terminals and aligning a second portion of the coil 29 with only these two magnetoresistors as required by independent claim 11, the Daughton patent discloses coupling the geographically distal magnetoresistors 23A and 23C in series between two power supply terminals but not aligning a first portion of the coil 29 with only these two magnetoresistors, and coupling the geographically distal magnetoresistors 23B and 23D in series between two power supply terminals but not aligning a second portion of the coil 29 with only these two magnetoresistors. This difference alone would have

suggested to one of ordinary skill in the art that the disclosures of the Daughton patent and the Bohlinger patent are opposite to one another and should not be combined.

Furthermore, since the Bohlinger patent shows an arrangement in which the first and second magnetoresistors 30 and 32 are coupled in series between two power supply terminals and in which the third and fourth magnetoresistors 20 and 28 are coupled in series between two power supply terminals, no useful purpose would be served by combining the Daughton patent and the Bohlinger patent.

Accordingly, combining the Daughton patent and the Bohlinger patent so as meet independent claim 11 would not have been obvious to one of ordinary skill in the art.

Therefore, for these additional reasons, independent claim 11 is not unpatentable over the Daughton patent in view of the Bohlinger patent.

Because independent claim 11 is not unpatentable over the Daughton patent in view of the Bohlinger patent, dependent claims 12-15 are not unpatentable over the Daughton patent in view of the Bohlinger patent.

Independent claim 36 - Independent claim 36 recites that the direction of current flow through the input strap is parallel to the direction of current flow through the first, second, third, and fourth magnetoresistors.

As shown in the Daughton patent, the current through the input coil 29 flows in a direction that is perpendicular, not parallel, to the direction of current flow through the first, second, third, and fourth magnetoresistors 23B, 23D, 23C, and 23A.

Similarly, the Bohlinger patent shows an arrangement in which the current through the coil 14 flows in a direction that is perpendicular, not parallel, to the direction of current flow through the first, second, third, and fourth magnetoresistors 30, 32, 20, and 28.

Therefore, the combination of the Daughton patent and the Bohlinger patent would not have lead one of ordinary skill in the art to the invention of independent claim 36.

Accordingly, independent claim 36 is not unpatentable over the Daughton patent in view of the Bohlinger patent.

Moreover, the Daughton patent explicitly discloses at column 19, line 62 through column 20, line 17 that the first and second magnetoresistors 23B and 23D are connected in series from the positive supply to ground, and that the third and fourth magnetoresistors 23C and 23A are connected in series from ground to the positive supply. This portion of the Daughton patent also states that the junction between the first and second magnetoresistors 23B and 23D forms one output of the bridge, and that the junction between the third and fourth magnetoresistors 23C and 23A forms the other output of the bridge.

Therefore, the magnetoresistors 23B and 23D are the first and second the magnetoresistors of independent claim 36, and the magnetoresistors 23C and 23A are the third and fourth the magnetoresistors of independent claim 36. (Alternatively, the magnetoresistors 23A and 23C are the first and second the magnetoresistors of independent claim 36, and the magnetoresistors 23D and 23B are the third and fourth the magnetoresistors of independent claim 36.)

Consequently, a current through the coil 29 does not generate a magnetic field over the first and second magnetoresistors 23B and 23D in a direction that

is opposite to the direction of the magnetic field that is generated over the third and fourth magnetoresistors 23C and 23A. Accordingly, the Daughton patent does not disclose the invention of independent claim 36.

The Examiner has not addressed this issue and has not explained why it would have been obvious in view of the Bohlinger patent to the align the coil 29 with the magnetoresistors 23A, 23B, 23C, and 23D to as to generate a magnetic field in the directions recited in independent claim 36. Therefore, the Examiner has not established a *prima facie* case of obviousness with respect to independent claim 36.

Accordingly, for this reason also, independent claim 36 is not unpatentable over the Daughton patent in view of the Bohlinger patent.

Moreover, the Daughton patent discloses a very unusual arrangement of connecting the magnetoresistors 23A, 23B, 23C, and 23D in a bridge configuration and of aligning the coil 29 with those magnetoresistors. Thus, instead of coupling and positioning the magnetoresistors 23A, 23B, 23C, and 23D so that a current through the coil 29 generates a magnetic field over the first and second magnetoresistors 23B and 23D in one direction and so that a current through the coil 29 generates a magnetic field

over the third and fourth magnetoresistors 23C and 23A in the opposite direction, the Daughton patent discloses coupling and positioning the magnetoresistors 23A, 23B, 23C, and 23D so that a current through the coil 29 generates a magnetic field over the first and third magnetoresistors 23B and 23C in one direction and so that a current through the coil 29 generates a magnetic field over the second and fourth magnetoresistors 23D and 23A in the opposite direction. This difference between independent claim 36 and the Daughton patent alone would have suggested to one of ordinary skill in the art that the disclosures of the Daughton patent and the Bohlinger patent are opposite to one another and should not be combined.

Furthermore, since the Bohlinger patent shows an arrangement in which a current through the coil 14 generates a magnetic field over the first and second magnetoresistors 30 and 32 in one direction and in which the current through the coil 14 generates a magnetic field over the third and fourth magnetoresistors 20 and 28 in the opposite direction, no useful purpose would be served by combining the Daughton patent and the Bohlinger patent.

Accordingly, combining the Daughton patent and the Bohlinger patent so as meet independent claim 36 would not have been obvious to one of ordinary skill in the art.

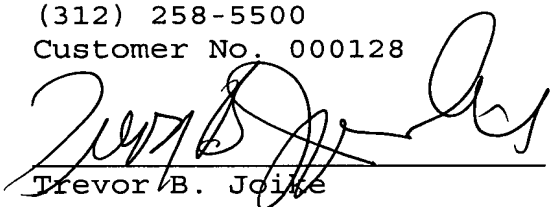
Accordingly, for these additional reasons, independent claim 36 is not unpatentable over the Daughton patent in view of the Bohlinger patent.

CONCLUSION

In view of the above, it is clear that the claims of the present application patentably distinguish over the art applied by the Examiner. Accordingly, allowance of these claims and issuance of the above captioned patent application are respectfully requested.

Respectfully submitted,

Schiff Hardin LLP
6600 Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606
(312) 258-5500
Customer No. 000128

By: 

Trevor B. Joike
Reg. No: 25,542

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